

Science

Landbird Migration Monitoring in the Upper Tanana Valley, Alaska

Landbirds are an important component of the biological diversity of North America, and nearly 20% of the world's avifauna inhabits the continent. The Upper Tanana Valley is an ideal area for migration monitoring because it is a major corridor for landbirds migrating to and from Interior Alaska, and significant numbers of a variety of landbird species can be sampled. The Alaska Migration Monitoring Program was initiated on the refuge in 1993 to assess remote populations of migratory landbirds in Alaska that have not been adequately monitored by other methods. Constant effort mist-netting is used during fall migration to capture, measure and band migrating landbirds. The effort is part of an interagency network of monitoring stations in Alaska coordinated through Boreal Partners in Flight. Banding data from this and other stations are pooled to provide long-term monitoring of landbird populations. Objectives of the project include identifying important stopover areas and habitats and estimating temporal trends in population size and breeding productivity of landbirds.

In 2009, our seventeenth consecutive season of fall migration banding, the banding station was staffed daily for the duration of 60 days from 30 July to 28 September. Total net hours were 7,089 hours, 98 percent of the possible 7200 hours for the season. The total number of new birds captured and banded for the season was 1,798 and was comprised of 31 different species. Additionally, 125 of those new captures were re-captured at a later time (at least once) and 5 birds captured were banded in years prior to the 2009 season (returns). Un-banded birds, birds that were captured but either escaped or were released before a band was placed on the bird, totaled 23. Mortalities, either human or environmentally caused totaled 4, being less than a half a percent (0.21%) of the total 1,941 birds handled. The six most captured species were: dark-eyed (slated-colored) junco (520 individuals), ruby-crowned kinglet (197), Swainson's thrush (172), fox sparrow (139), orange-crowned warbler (108) and Wilson's warbler (108).

Breeding Ecology and Habitat Affinities of the Rusty Blackbird, an Imperiled Species, on Tetlin Refuge

Tetlin Refuge as Alaska's Land Management Research Demonstration (LMRD) area, has been collaborating with the nonprofit Alaska Bird Observatory (ABO) to study the nesting habits of the rapidly disappearing rusty blackbird and relate those findings to the boreal forest landscape, the birds' nesting ground.

Indeed, Tetlin Refuge was selected in 2002 for LMRD designation in part because the refuge is located entirely in boreal forest. The boreal forest, one of the world's largest terrestrial ecosystems and a critical carbon reservoir, is an important habitat component of many Alaska refuges. Eight refuges in Alaska contain approximately 30 million acres of boreal forest, roughly a third of all lands in the refuge system.

Tetlin Refuge's on-going research is one of several investigations underway in Alaska to study the breeding ecology of the rusty blackbird. The U.S. Fish and Wildlife Service's migratory bird management office in Anchorage has been working with ABO and the state's Department of Fish and Game to coordinate the studies. The rusty blackbird, which breeds exclusively in the wetlands of the boreal forest, has – for reasons unknown – suffered one of the steepest declines of any bird species in North America. The North American Breeding Bird Survey shows the population has declined by more than 95 percent since 1966.

Though the species has been identified as a high priority for conservation at the continental level by the international Partners in Flight initiative and is included on the International Union of Conservation Red List, it has been little studied – in part because the birds breed in such remote locations.

To learn more, the LMRD program used a Challenge Cost-Share agreement to begin a study with the ABO that focuses on the breeding ecology and habitat affinities of rusty blackbirds. The findings, when coupled with the results of other studies, may identify the limiting factors for this species so we can move toward conservation measures that will reverse the birds' precipitous decline.

The first year of fieldwork, which focused on 600 acres on the southeastern edge of the refuge, was led by a graduate student from Antioch University. In a search that began in May 2008, she and her field assistant located 13 nests by watching adults from a distance and following them back to their nests, a process that requires lots of time and patience. The searching was conducted on foot and sometimes by canoe. The nests were revisited every two to seven days to determine clutch size and hatchability of eggs, length of incubation and nestling periods, nest survival, number of young fledged from successful nests and the causes of failed nesting attempts.



Rusty Blackbird photo. Photo Credit: David Shaw/Alaska Bird Observatory

She monitored the birds until July 2008, when the birds began to disperse from the study area. Her data are being compared with information gathered at random sites elsewhere on the refuge and at other locations near Fairbanks and Anchorage. We hope to expand the refuge study this summer in Partnership with the Alaska Department of Fish and Games Wildlife Diversity Program. In addition to placing more people in the field, we plan to examine the phenology, abundance and diversity of dragonflies and damsel flies, an important food resource for rusty blackbirds, especially during the breeding season. Beginning an investigation of rusty blackbird foraging ecology will add to the information we need to understand their decline. In determining prey availability and preference, foraging habitat and foraging behavior, we hope to gain insight into what may limit these populations.

Raptors Monitoring in the Upper Tanana Valley, Alaska

One of the established purposes for Tetlin Refuge is "to conserve fish and wildlife populations and habitats in their natural diversity including but not limited to, waterfowl, raptors and other migratory birds..." Predators at the top of the ecological web are indicators of environmental health because their existence and welfare depend on the levels below them. Nineteen species of raptors occur in the upper Tanana Valley. Raptor monitoring efforts have emphasized such indicator species whose nesting sites are fairly common and relatively easy to locate. These include American Peregrine Falcon (*Falco peregrinus anatum*), Bald Eagle (*Haliaeetus leucocephalus*), and Osprey (*Pandion haliaetus*). Falcons are closely monitored due to their prior classification under the Endangered Species Act of 1973. After removal from the list of endangered species in August 1999, it was recommended that the Tanana River falcon population be monitored for at least five years following delisting. Special attention is given to Bald Eagles and Golden Eagles (*Aquila chrysaetos*) because they are protected under the Bald Eagle Protection Act as amended in 1962. Bald Eagles and Osprey are also important because of their close association with aquatic ecosystems. Limited numbers of nesting territories of other species are also monitored, and include: Northern Goshawk (*Accipiter gentilis*), Harlan's Hawks (*Buteo jamaicensis*), American Kestrel (*Falco sparverius*), Great Horned Owl (*Bubo virginianus*), Great Gray Owl (*Strix nebulosa*), Northern Hawk Owl, and Common Raven (*Corvus corax*).

The first scientific documentation of raptors in the upper Tanana Valley were made in 1921 by Olaus Murie when he noted five pairs of nesting Peregrine Falcons and numerous Red-tailed or Harlan's Hawks along the Tanana River between Tanacross and Shaw Creek. More recently, raptors have been periodically surveyed in the upper Tanana Valley since 1961.

As part of its Wildlife Inventory Plan, Tetlin Refuge has collected raptor nesting territory occupancy and productivity data in the upper Tanana Valley annually since 1991. Each year over 300 visits are made by aircraft or foot to over 150 raptor nests from May through August to record observations on breeding bald eagles (41 to 67 nesting territories), osprey (26 to 42 territories) and peregrine falcons (3 to 18 territories). Nests are checked for occupancy by a breeding pair in spring and then revisited in July to determine nest success or failure (survival of young) and productivity. Raptor productivity is an average measure of how many young birds fledge from all the occupied nests and is used by biologists to monitor breeding populations.



Photo of three peregrine nestlings, about 2 weeks old. Photo Credit: Hank Timm/USFWS

Here is an example of data results for surveys conducted in 2009: Observations of bald eagle, osprey and peregrine falcon nests accounted for more than 88% of 519 observations made to 192 nests of 9 raptor species in 143 nesting territories in 2009. Aerial surveys for bald eagles and osprey were completed between 19-21 May for occupancy and 21-29 July for productivity. River and ground based surveys on foot for peregrine falcons were conducted between 9 May-23 June for occupancy and 7-24 July for productivity. Bald eagle occupancy was near average (63.1%; 1991-2008 mean = 65.99%), while the other 3 parameters were lower than average for 65 nesting territories surveyed: success (second lowest year at 35.0%; mean = 51.93%), productivity (second lowest year at 0.40 young per occupied nest; mean = 0.66), and mean brood size (1.14 young per successful nest; mean = 1.26). Osprey occupancy was average (76.5%; mean = 75.31%) for 34 nesting territories surveyed, but success (86.4%; mean = 59.20%), productivity (1.77; mean = 1.10) and mean brood size (2.05; mean = 1.85) were all higher than average. Osprey had both the highest success and productivity recorded since 1991. Peregrine falcon occupancy was higher than average (94.4%; mean = 88.04%) for 18 nesting territories surveyed, but success (78.6%; mean = 88.01%), productivity (1.71; mean = 2.31) and mean brood size (2.18; mean = 2.60) were all lower than average. Mean dates were estimated for peregrine falcons by estimating nestling ages (for 24 nestlings) and mean hatching date (20 June 09), backdating 33 days from hatching for mean egg laying date (18 May 09) and forward dating 40 days for mean fledging date (30 July 09); each more than 2 days later than the mean dates for 2003-2008.

Raptors are sensitive to disturbances during the nesting season (May to August) and should not be approached closely. Please observe any raptor nests from a safe distance and report their locations to refuge staff at the headquarters office on 1.3 mile Borealis Ave, or by phone at 883-5312. For more information on raptors in the upper Tanana Valley, contact the Tetlin National Wildlife Refuge. Photo of three peregrine nestlings about 2 weeks old.

Moose Population Surveys in the Upper Tanana Valley, Alaska

Primary purposes of the Tetlin Refuge include conserving the natural diversity of fish and wildlife populations and habitats, and for providing subsistence opportunities for local residents. Moose (*Alces alces*) are an integral part of the natural communities of the upper Tanana Valley and a key component of the annual subsistence harvest of many area residents.

To adequately monitor moose populations that occur within Tetlin Refuge and adjacent areas, estimates of population size and structure need to be generated. Shortly after Tetlin Refuge was established in 1981, staff began collaborating with the Alaska Department of Fish and Game (ADF&G) to collect information on the local moose population. As early as 1982, trend and composition surveys were conducted on Tetlin Refuge and adjacent areas in Game Management Unit (GMU) 12 using methodology developed by ADF&G to maintain data consistency. The first large-scale moose census to include Tetlin Refuge was completed in the fall of 1990 in cooperation with ADF&G. This census used methods developed by Gasaway et al, and incorporated a stratified-random sample of an area

encompassing Tetlin Refuge, portions of Tetlin Village Council and both Tetlin and Northway Native Corporations lands, Wrangell-St. Elias National Park and Preserve, and Alaska State lands within GMU 12. Subsequently, Tetlin Refuge completed trend and composition surveys annually through 1999, conditions permitting.

During the fall of 2000, 2001, 2003, 2004, and 2008 Tetlin Refuge conducted aerial moose surveys encompassing roughly the same area as that surveyed in 1990. These surveys use a statistical method developed by Ver Hoef, called Finite Population Block Kriging that is based on spatial correlation and has been successfully used for estimating and monitoring moose abundance in Alaska and Yukon. This sampling method has several advantages over classical stratified random sampling: (1) higher precision, (2) provides estimates for smaller areas, and (3) does not require random sampling. It also has a more flexible stratification protocol, making the survey logistically easier to conduct and therefore safer and less expensive.



Photo of a cow moose and calf in water. Photo Credit: Hank Timm/USFWS

The most recent aerial moose survey was conducted on Tetlin National Wildlife Refuge and the northeast corner of Game Management Unit (GMU) 12 from 6 – 22 November 2008. The population was estimated to be 1,843 moose for the 7,651 km² (2,954 mi²) survey area. Moose density was 0.24 moose / km² (0.62 moose / mi²). The estimated ratios of bulls, yearling bulls, and calves per 100 cows were 61.7, 14.0, and 24.5 respectively. Bulls made up 32.3% of the population, cows 52.7%, and calves 12.7%. Given our estimates of moose density, percentage of adult bulls, calf production, and yearling recruitment, the moose population within the survey area appears to be healthy and at an increased density from previous years. Although the overall moose density is considered low for interior Alaska, it has increased from previous years, the adult age class structure is diverse, and calf production and recruitment continue to be good. The area included in these surveys is generally less accessible than other areas of GMU 12 and sustains a lower moose harvest. For more information on moose contact the Tetlin National Wildlife Refuge.